

CLAIMS

1. A showerhead that supplies a source gas and a supporting gas into a vacuum atmosphere in a processing vessel, so as to deposit a film on a surface of an object to be processed in the processing vessel, comprising:

a showerhead body provided with a gas jetting surface facing an inside of the processing vessel;

a first diffusion chamber formed in the showerhead body to receive the source gas and diffuse the same;

a second diffusion chamber formed in the showerhead body to receive the supporting gas and diffuse the same;

a plurality of source-gas jetting orifices formed in the gas jetting surface to be communicated with the first diffusion chamber; and

a plurality of first supporting-gas jetting orifices formed in the gas jetting surface to be communicated with the second diffusion chamber,

wherein each of the first supporting-gas jetting orifices is formed into a ring shape that adjacently surrounds a corresponding one of the source-gas jetting orifices.

2. The showerhead according to claim 1 further comprising a plurality of second supporting-gas jetting orifices formed in the gas jetting surface to be communicated with the second diffusion chamber, wherein

each of the second supporting-gas jetting orifices is arranged between adjacent two of the source-gas jetting orifices.

3. The showerhead according to claim 1, wherein the source gas contains a high melting point metal.

4. The showerhead according to claim 3, wherein the source gas is an organic metal material gas.

5. A showerhead that supplies a source gas and a supporting gas into a vacuum atmosphere in a processing vessel, so as to deposit a film on a surface of an object to be processed in the processing vessel, comprising:

a showerhead body provided with a gas jetting surface facing an inside of the processing vessel;

a first diffusion chamber formed in the showerhead body to receive the source gas and diffuse the same;

a second diffusion chamber formed in the showerhead body to receive the supporting gas and diffuse the same;

a plurality of source-gas jetting orifices formed in the gas jetting surface to be communicated with the first diffusion chamber; and

a plurality of first supporting-gas jetting orifices formed in the gas jetting surface to be communicated with the second diffusion chamber,

wherein each of the source-gas jetting orifices is adjacently surrounded by at least two of the first supporting-gas jetting orifices.

6. The showerhead according to claim 5 further comprising a plurality of second supporting-gas jetting orifices formed in the gas jetting surface to be communicated with the second diffusion chamber, wherein

each of the second supporting-gas jetting orifices is arranged between adjacent two of the source-gas jetting orifices.

7. The showerhead according to claim 5, wherein the source gas contains a high melting point metal.

8. The showerhead according to claim 7, wherein the source gas is an organic metal material gas.

9. A film deposition apparatus that deposits a film on a surface of an object to be processed, by using a source gas and

a supporting gas, comprising:

- a processing vessel;

- an evacuation system that evacuates an inside of the processing vessel to form therein a vacuum;

- a table provided in the processing vessel to dispose thereon the object;

- a heater that heats the object disposed on the table; and

- a showerhead provided on a top part of the processing vessel; the showerhead including:

 - a showerhead body provided with a gas jetting surface facing an inside of the processing vessel;

 - a first diffusion chamber formed in the showerhead body to receive the source gas and diffuse the same;

 - a second diffusion chamber formed in the showerhead body to receive the supporting gas and diffuse the same;

 - a plurality of source-gas jetting orifices formed in the gas jetting surface to be communicated with the first diffusion chamber; and

 - a plurality of first supporting-gas jetting orifices formed in the gas jetting surface to be communicated with the second diffusion chamber,

 - wherein each of the first supporting-gas jetting orifices is formed into a ring shape that adjacently surrounds a corresponding one of the source-gas jetting orifices.

10. The film deposition apparatus according to claim 9, wherein

- the showerhead further includes a plurality of second supporting-gas jetting orifices formed in the gas jetting surface to be communicated with the second diffusion chamber, and

- each of the second supporting-gas jetting orifices is arranged between adjacent two of the source-gas jetting orifices.

11. A film deposition apparatus that deposits a film on a surface of an object to be processed, by using a source gas and

a supporting gas, comprising:

- a processing vessel;

- an evacuation system that evacuates an inside of the processing vessel to form therein a vacuum;

- a table provided in the processing vessel to dispose thereon the object;

- a heater that heats the object disposed on the table; and

- a showerhead provided on a top part of the processing vessel; the showerhead including:

 - a showerhead body provided with a gas jetting surface facing an inside of the processing vessel;

 - a first diffusion chamber formed in the showerhead body to receive the source gas and diffuse the same;

 - a second diffusion chamber formed in the showerhead body to receive the supporting gas and diffuse the same;

 - a plurality of source-gas jetting orifices formed in the gas jetting surface to be communicated with the first diffusion chamber; and

 - a plurality of first supporting-gas jetting orifices formed in the gas jetting surface to be communicated with the second diffusion chamber,

wherein each of the source-gas jetting orifices is adjacently surrounded by at least two of the first supporting-gas jetting orifices.

12. The film deposition apparatus according to claim 11, wherein

- the showerhead further includes a plurality of second supporting-gas jetting orifices formed in the gas jetting surface to be communicated with the second diffusion chamber, and

- each of the second supporting-gas jetting orifices is arranged between adjacent two of the source-gas jetting orifices.